

DETACHMENT OF THE RETINA AND ITS
TREATMENT, WITH FOUR ILLU-
STRATIVE CASES.

A WARD LECTURE IN THE PHILADELPHIA HOSPITAL.

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DETACHMENT of the retina, by which is understood, in the widest acceptation of the term, a separation of this membrane from its organic connections with the underlying choroid, is an ocular lesion, destined in many cases to destroy, or, at all events, to vitiate materially the functions of the affected eye.

The *relative frequency* of this affection may be gathered from the statistics published by Galezowski.* This observer analyzed 152,000 cases of ocular disease with reference to this point, and found 784 detachments, or .52 per cent. of the whole number.

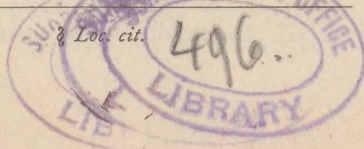
The *serious nature* of the disease is evident by a reference to the statistics of the causes of blindness. Thus, in the table of blindness, from idiopathic diseases of the eye, given by Magnus, and confined to patients under twenty years of age, we find among 1060 cases 27, or .84 per cent., accredited to *sublatio retinae*. Again, in 2528 cases of blindness of both eyes, among adults and children, observed by Schmidt-Rimpler, Stolte, Uhthoff, Hirschberg, Landesberg, Bremer, Seidelmann, Katz, and Magnus,† 1696 had lost their vision from idiopathic ocular diseases, of which retinal detachment constituted 120, or 4.726 per cent. It is unnecessary, however, to confine ourselves to the European clinics for information on this point. Drs. H. F. Hansell and J. H. Bell‡ have published an excellent statistical review of the proportion and cause of blindness in 32,000 eyes consecutively treated in the Jefferson College Hospital, under the care of Dr. William Thomson; and in examining the specific causes of lost vision, irrespective of age, sex, or other relation, in the order of their frequency, have found the percentage of detachment of the retina to the whole number of blind eyes to be 2.21.

The *causes* of retinal detachment reside in various morbid conditions of the eye or surrounding orbital tissues, so-called idiopathic separation being due to an accumulation of serous fluid between the retina and the choroid, although the affection may also be occasioned

by an effusion of blood in the same situation, or by the presence of a solid growth arising from the choroid, or a cystic body lying beneath the retina. The main causes may be summarized as follows: Advanced (malignant) myopia; traumatisms; effusion of blood, preceded usually by hemorrhages into the vitreous or retina; intraocular tumors; tumors and abscesses in the orbit; diseased conditions of the eye, as retinitis, cyclitis, irido-cyclitis, chronic choroiditis, hyalitis, etc.; and, finally, cases of detachment occur suddenly, in which none of the affections which have been named are present. In old people, warm baths and colds are mentioned as possible exciting causes by Schmidt-Rimpler and Becker. In the collection of cases by Galezowski,§ among 784 detachments, there were 532 men and 252 women, both eyes being affected 57 times. The causes in his cases of retinal detachment are thus enumerated: 646, myopia; 194, trauma; 13, after operations; 12, syphilis; 4, sympathetic inflammations; and 10, tumors. Nordensen's researches (to which I shall have occasion to refer again) agree with the statistics just quoted, that more men than women are affected, and that myopic refraction most frequently is present, the separation being more apt to occur in an eye in which the visual disturbance has rapidly developed. Hence one of the complications always to be dreaded in advanced myopia is detachment of the retina. Traumatism, you see, accounts for many cases; for example, the blunt force applied to the globe by the impact of a flying cork from a bottle, a piece of wood, or a racket-ball. The immediate result of a perforating wound of the sclera, on account of extensive loss of vitreous, may be retinal detachment, or this may occur later, as the result of cicatricial contraction when the retina has become adherent to the cicatrix. An ordinary rupture of the choroid, as has been pointed out by Knapp, may in time be followed by detachment of the retina. Those retinal separations which result from operation are in one sense properly classed with traumatisms, the accident being most often seen some time after cataract extraction, especially when the wound has had a peripheral situation, and has healed with a bulging (cystoid) cicatrix. In irido-cyclitis and irido-choroiditis, the shrinking of organized exudates in the vitreous drags the retina from the choroid, and in many blind and atrophied eyeballs, after removal, a funnel-shaped detachment of the retina is found. This is well illustrated in

* *Recueil d'Ophthalmologie*, 1888, p. 151.

† Quoted by Noyes, "Diseases of the Eye," p. 700.

‡ *Archives of Ophthalmology*, vol. xxi. p. 51.

this drawing taken from Wedl and Bock's atlas, and also in the specimens which I exhibit.

A number of theories have been propounded to explain the *mechanism* of detachment of the retina, and although its pathology is not definitely settled, it may be stated that all cases of idiopathic separation are preceded by a change in the pressure exerted by the vitreous upon the retina (whereby this membrane is kept in place against the choroid), and it is highly probable that this change consists in detachment and shrinking of the vitreous.

It would be interesting to trace the different views which have been held in regard to the pathology of detachment of the retina, but as time scarcely permits an extended review of this character, I will refer briefly to the *résumé* given by Schoeler. Before the time of Heinrich Müller much weight was attached to what is known as the "secretion theory,"—namely, that the phenomena of separation of the retina depended in some way upon an anomalous secretion of fluid. In 1856, however, Müller taught that filamentous or membranous opacities in the vitreous, by contracting, might detach the vitreous body alone, or being attached to the retina, this might follow the shrinkage, and thus cause separation of this membrane from the choroid. In 1867 Iwanoff, on the basis of anatomico-pathological investigations, demonstrated that disease of the vitreous body tended to produce detachment of the vitreous, and that the latter condition was a forerunner to retinal detachment. In 1870 De Wecker suggested that the fluid found in the sub-vitreal space after detachment of the vitreous succeeded in passing behind the retina through a rupture which took place in this membrane. Working upon these lines, Leber, in 1882, and Nordensen, in 1887, have developed the most satisfactory explanation which is given of retinal detachment. The first process is a fibrillar change in the vitreous which leads through shrinking to detachment of the vitreous body, and by extension of the lesion to the equator of the ocular globe, where the retina is most intimately connected with the vitreous, the tension causes a rent in the retina behind which passes the fluid which has gathered between the detached vitreous body and the retina. Now, it is not always possible to find this rent, although Nordensen, whose research goes far to confirm the explanation given by Leber, found the tear in nearly forty per cent. of the cases in which he looked for it. No doubt it was present in many others, but escaped observation owing to opacities in the

media, or because it was far in the periphery of the fundus. The primary cause of the pathological change in the vitreous, which thus shrinks and occasions traction, is believed by Nordensen to be disease of the choroid and ciliary body; hence the greater liability of this accident in eyes affected with advanced and progressive myopia.

The *objective symptoms* of detachment of the retina, as furnished with the ophthalmoscope in the direct method of examination, consist in an alteration of refraction at the area of separation, the surface of the elevation thus produced being out of focus as compared with the rest of the eye-ground. The detached retina appears as a gray or bluish-gray membrane, stretching forward into the vitreous, and containing folds which give rise to a sheen. The intervening furrows present a greenish-gray reflex, and the whole trembles with the movements of the eye. When the underlying substance is solid, however, neither folds nor tremulousness are present. Not uncommonly it is possible to demonstrate rents in the detached retina, through which the dull color of the choroid is readily visible. The importance of these in regard to the mechanism of the affection has already been pointed out. In extensive detachment of the retina, the membrane may have floated so far forward in the vitreous that it is possible to see it even without the aid of an ophthalmoscope. The retinal vessels present characteristic features. First, they lose the light streak, and finally appear as dark, tortuous cords, often smaller than the normal size, and when they are folded backward, they pass out of focus at the edge of the detachment, which is often sharply marked from the normal fundus. Indeed, there may be a yellowish border and occasionally accumulated pigment. Naturally, the discoloration of a detached retina depends upon whether the case is recent or not, and upon the character of the underlying substance. In the earlier stages the transparency is not lost, and the gray color previously described is not present. The detachment is either partial or complete, and may occupy any portion of the fundus, but most commonly is found below, even when it has begun in the upper part. Detachments in the form of a series of furrows are sometimes found, and also circular circumscribed separations. Occasionally, the subjective symptoms of detachment are present, although the ophthalmoscope fails to reveal any elevation in the retina. Over this area, however, as Loring has pointed out, there is complete loss of the light reflex from the retinal vessels. Unless the macular region is directly involved, vision is

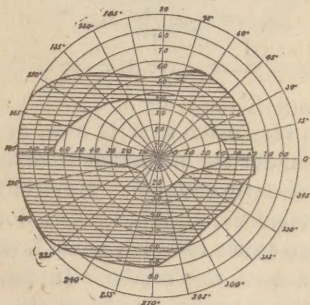
not obliterated, although there is always more or less interference with sight. This may suddenly, or, like the detachment itself, may arise slowly.

The *field of vision* is lost in an area corresponding to the detached retina, the completely darkened portion often being bordered by a zone of imperfect vision, which corresponds to an area of the retina not yet separated, but elevated above the normal plane. If the retina is detached below, the upper portion of the field is obliterated; if above, the lower; and so on. Occasionally disturbances in the visual field are not present in the early stages of retinal detachment, because the recently-detached retina retains its function; hence the restriction of the field may escape observation, unless, as Berry suggests, the examinations be made with subdued light.

The *objective symptoms* of this affection consist in a distortion of objects, floating spots before the eye due to frequent vitreous opacities, an appearance like a cloud due to the scotoma produced by the separated area, and sometimes phosphenes.

There is very little difficulty in making a diagnosis of extensive detachment of the retina by attending to the symptoms which have already been described, and if the media are sufficiently clear, the ophthalmoscope is usually an all-sufficient method of investigation. When the vitreous is full of opacities, however, or when the detachment of the retina has occurred in connection with irido-cyclitis, and the inflammatory products have blocked the pupil and rendered ophthalmoscopic examination impossible, the field of vision gives the

FIG. I.



Field of vision of a case of chronic irido-cyclitis, with detachment of the retina.

best information. This is well illustrated in the diagram which I present to you taken from a case of chronic irido-cyclitis and probable detachment of the retina.

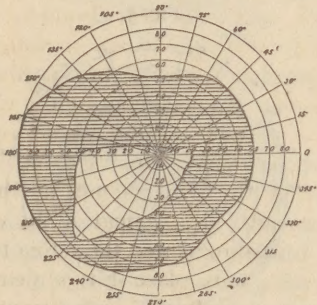
It is not always easy, however, to make a differential diagnosis between detachment of the

retina and sarcoma of the choroid, or, indeed, any intraocular growth. The points upon which a differential diagnosis are based are the following: In choroidal sarcoma the defect in the field of vision is more sharply circumscribed, the central vision less decidedly affected, and the overlying retina exhibits no tremulousness. Moreover, the tension is apt to be diminished in detachment of the retina and raised in intraocular growth. None the less, errors in this respect have not infrequently been made, and more than one acute diagnostician has hesitated for a long time between the diagnosis of idiopathic retinal detachment and choroidal sarcoma.

To illustrate the subject which we are discussing, I present for your consideration four cases of detachment of the retina.

CASE I.—Mary S., a woman, aged thirty-eight, about two years ago suddenly experienced a cloud before the left eye, and on testing in a rough way her own vision, found that it was materially reduced or practically absent in this eye. Presumably the detachment of the retina, which you can see with the ophthalmoscope, happened at this time. About a year and a half ago she was under treatment in the

FIG. 2.



Field of vision of Case I., left eye.

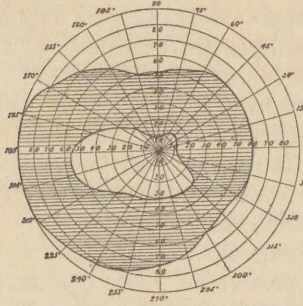
Philadelphia Polyclinic, but without material benefit. The right eye is not far from normal, being slightly hypermetropic in refraction. In the left eye, also hypermetropic, there is a huge detachment of the retina, the whole lower half of this membrane being separated, floating forward in the vitreous as a grayish-green membrane at an elevation of 7 or 8 D. This diagram illustrates the field of vision, the outer continuous line marking the boundary of the normal visual field, the shaded area where vision was lost, and the inner white area that portion of the field which is still preserved, representing the extent of retina which is still functionally active and in place.

CASE II.—Franz G., a young man, aged twenty-two, born in Germany, states that as

long as he can remember he has never seen well. There is no history of blindness in his family. He has suffered from rachitis, and now has well-marked phthisis of the left apex. In 1890 he consulted Duke Carl Theodore, of

thirteenth year he had good eyes. Then he experienced an attack of chorea, after which the vision was poor, and he attended Wills Hospital under the care of Dr. Harlan, being an in-patient for about six weeks, and after-

FIG. 3.

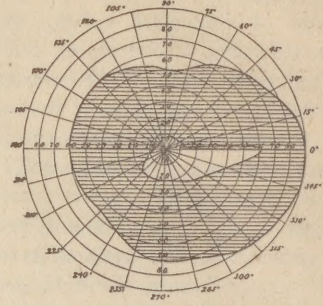


Field of vision of the left eye of Case II.

Bavaria, and Berlin, of Stuttgart, and underwent two operations, probably scleral punctures, to the method of performing which I shall presently refer. The vision of each eye is extremely poor, fingers being counted with difficulty in the lower field. In the right eye the cornea is clear, the disk is oval, gray, and at its outer margin there is a slight crescent of choroiditis. There is a huge detachment of the retina not far from complete in the right

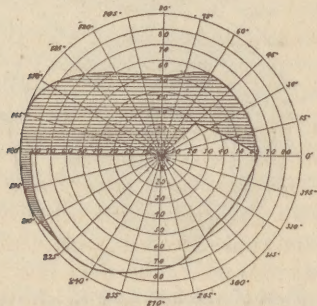
wards an attendant at the dispensary service for a number of months. Improvement occurred, because he was able to go to work, but after ceasing his attendance at the hospital, he did nothing for his eyes except to visit an irregular practitioner, who promised to cure him by furnishing him with glasses. Gradually the disease progressed, and finally his eye-sight became so deficient that in January of last year he entered the hospital. His condition

FIG. 4.



Field of vision of the right eye of Case II.

FIG. 5.

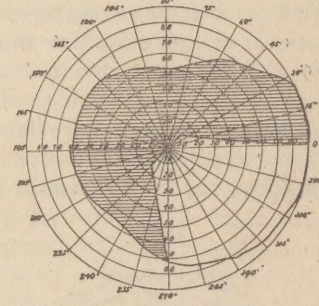


Field of vision of the left eye of Case III., taken with two candles.

eye, and nearly complete in the left. The greatest height of the detachment is $+7$ D, and the undetached patch of retina in the right eye shows evidences of slight choroiditis. In the left eye the disk is oval, the veins very large, and there is a similar but not quite so extensive detachment of the retina, the greatest height of which is 5 D. There are no demonstrable vitreous opacities. The accompanying diagrams, constructed on the plan previously described, show what a very small portion of the field remains and how very near the macula the lesion has progressed.

CASE III.—Charles A., a man, aged twenty-five, American by birth, states that up to the

FIG. 6.



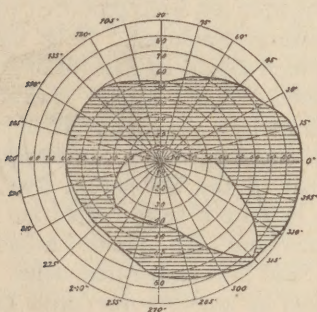
Field of vision of the right eye of Case III.

then was very much as it is now, and did not improve under the medicinal treatment, which I shall presently describe. He declined operative interference, and, indeed, it does not appear to be a case in which much hope could be extended from this source. In the right eye he can barely count fingers in the lower and outer quadrant of the field, and in the left eye he has light perception in the lower portion of the field. There is extensive detachment of the retina, so that in the right eye, as you see from the diagram, there remains only a very small portion of vision in the lower and outer quadrant of the field. In the left eye it is possible to determine the field of vision with can-

dles, one being used for fixation and the other for the test-object, and you see that light perception is present only in part of the lower half of the field. In both eyes the detachment involves the macular region. With the ophthalmoscope an extensive detachment of the retina is evident, which floats up in the vitreous, spots of choroiditis being evident in the portion not yet detached, while the vitreous is full of floating opacities. This is an extensive state of disorganization, offering very little hope so far as remedial agents, either operative or otherwise, are concerned.

CASE IV.—Hugh M., a man, aged fifty, presents an interesting state of affairs. The right eye was injured by a blast twenty-four years ago, and was considered by the patient to be valueless until his left eye was affected. Now it is the more useful organ of the two. There is an irregularly oval pupil, with adherence of the iris to a small scar in the cornea, and a separation of the iris at the outer ciliary margin. Over the cornea are scattered several cicatrices. The remains of the capsule of the lens is seen to border the pupillary margin. It is not possible to obtain a view of the fundus, but from the diagram of the field of vision, which I present to you, you observe that probably there is detachment of the whole lower half of the retina, with concentric restric-

FIG. 7.



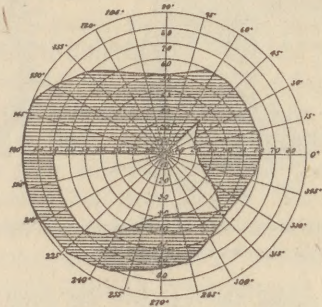
Field of vision of the right eye of Case IV.

tion of the field of vision furnished by the unseparated area. Fortunately, however, the macular region is not involved, and with a cataract-glass the patient's visual acuity is $\frac{2.0}{cc}$.

The sight of the left eye was good until July, 1891, and then, while he was working, sudden blindness occurred. There has never been pain nor inflammation. He consulted Dr. Sutphen, of Newark, N. J., who has very kindly furnished me with an account of what he did for the patient at this time. He was ordered to bed and treated by injections of pilocarpine, and later iodide of potassium was administered internally. There was steady increase in the

detachment until it became total, and scleral puncture was made upon the left eye December 1, 1891. There was no reaction whatever from the operation, except slight oedema of the conjunctiva, which lasted three days. Material improvement in vision was noted from the second day following the operation. The patient remained in bed three weeks, and left the hospital January 15, 1892, with the retina in its normal position and vision $\frac{2.0}{30}$. The patient states that, contrary to Dr. Sutphen's orders, he went to hard work, and very speedily his sight became as bad as ever. He declares that he was ashamed to go back to consult Dr. Sutphen, and well he may have been, because, owing to his own foolishness and disobedience, the benefit of Dr. Sutphen's excellent treatment was lost, and there has

FIG. 8.



Field of vision of the left eye of Case IV. Test-object a candle-flame.

been a return of the disease, so that there is now an extensive detachment of the retina, which has involved the fixing-point. The disk, which is visible, is oval, and contains a small, central excavation, with a dot of pigment upon its margin. The detached retina floats up as a gray veil in the vitreous, which, in its turn, is filled with opacities, the lens is hazy, and there are considerable cortical opacities in the crystalline lens downward and inward. The accompanying diagram exhibits the field of vision, and was obtained by causing the patient to fix upon a candle placed at the centre of the perimeter, while a large, white test-object was utilized to map out the field.

These cases serve to illustrate the affection which we have been discussing this afternoon, and also to introduce the concluding remarks in regard to the *treatment*, which naturally divides itself into non-operative or medical treatment, and operative interference.

In former times many of the patients were subjected to the severe, so-called *antiphlogistic regimen* which was so much in vogue,—namely,

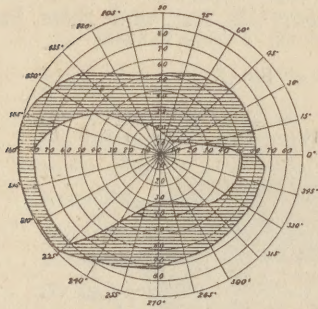
free bloodletting from the temple, either with leeches or wet-cups, sinapisms, drastic purges, active foot-baths, and even setons. Pursuing the same line even at the present time, derivative medication has been largely employed, and many cases of detachment of the retina, in addition to this, have received full doses of iodide of potassium and mercury, either by the mouth or by means of inunction, with the hope of absorbing the subretinal fluid, very much on the same principle as it was hoped to influence an effusion into the pleural sac.

Less depressing, but requiring a great amount of patience on the part of the sufferer, is what

the field of vision. Central vision, however, did not improve.

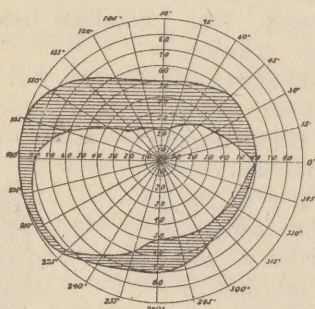
A third form of treatment may be characterized as the *diaphoretic method*. In this the patient is confined to bed, either with or without a pressure bandage, and, according to his power of endurance, freely sweated with hypodermic injections of pilocarpine, alternating sometimes with the administration of salicylate of sodium. This treatment has much to commend it, and there are numbers of cases on record in which decided improvement has occurred. It should be remembered, however, that not every patient is able to withstand the depressing influence of exhausting sweats, and very often, in the hope

FIG. 9.



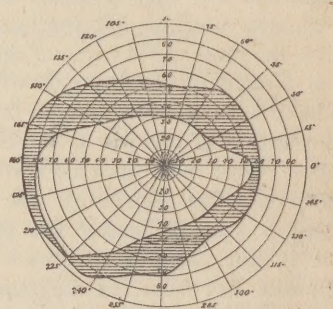
Field of vision in a case of retinal detachment before the use of eserine.

FIG. 10.



Field of vision after one month of eserine-instillations.

FIG. 11.



Field of vision after five weeks of eserine-instillations.

may be called the *rest-cure* for detachment of the retina. This consists in placing the patient on his back, giving him an almost entirely liquid diet, chiefly composed of milk, and keeping both eyes closed with a pressure bandage. In a few instances this method has been followed by good results, and there has been reattachment of the separated membrane; but, like all other procedures connected with the treatment of detachment of the retina, it has a long list of failures to its credit.

In some instances, especially on the recommendation of Guaita, there has been amelioration of the symptoms of retinal detachment and increase in the field of vision under the influence of eserine instillations, although there was resumption of the symptoms upon ceasing the use of the drug. In several cases under my own care I tried very faithfully this use of eserine, adding to it at times a pressure bandage, but not confining the patient to bed. In one instance small doses of iodide of potassium were also taken, but only for a short period of time, and probably not in sufficient dose to influence the progress of the disease. The accompanying diagrams illustrate what effect was produced by this method in one case, and you observe there was slight increase in the size of

of reattaching a separated retina, undue depression of nutrition has been produced by the vigorous measures employed. It is, however, a method which should be thought of first of all, and in suitable cases should always be employed, as we have the experience of many observers for encouragement; for example, Roosa reports that in the Manhattan Eye and Ear Hospital, in quite a large proportion of cases, good results have been obtained from the rest-, bandage-, and pilocarpine-treatment.

A number of *operative procedures* have been devised; for example, sclerotomy (Wolfe, Abadie), iridectomy (Dransart, Brettremieux), methods which, although they have a few cures to their credit, are generally condemned. Naturally, most of the attempts have been towards the evacuation of the subretinal fluid by puncturing the sclerotic, as was originally suggested by Sichel in 1859. At one time after the puncture De Wecker suggested drainage of the subretinal fluid by the introduction of a gold or catgut thread. Aspiration without drainage has been practised by Galezowski, and Graefe, in some instances, entered the globe with a broad cataract-needle at the side opposite the detachment, cut into the retina from the vitreous, and allowed the subretinal

fluid to pass into the vitreous body. Galvano-puncture was at one time proposed by Abadie, the puncture being made backward from the ciliary region. In fresh cases, but not in old ones, some good results were reported. This method has quite recently been advocated again by some French surgeons.

In a number of instances, in addition to scleral puncture, irritating fluids—for example, Condy's fluid and tincture of iodine—have been injected with the hope of producing adhesive inflammation. The cure of retinal detachment by the injection of iodine into the subretinal space received a great impetus after the publications of Schoeler, in Berlin, who reported a number of successful cases. Soon, however, other operators who tried the method recorded examples in which destructive inflammation followed the method, with complete loss of the eye; and in a valuable series of cases reported by Dr. Bull, of New York,—valuable because they seem to show very conclusively the danger of the method,—Schoeler's injections of iodine were proved to be of no value! Perhaps experience with this measure is not sufficiently great to condemn it entirely, but it is not enough to recommend it as a therapeutic measure free from danger.

Scleral puncture may be recommended as the method least likely to do harm, and perhaps most likely to do good, but only after a thorough rational medicinal treatment has been employed. The precise position of the retinal detachment must be ascertained, the eyeball is rotated in a suitable direction, a narrow Von Graefe cataract-knife is thrust directly through the sclera and choroid, turned slightly upon its axis, and the subretinal fluid allowed to drain away beneath the conjunctiva. Very little reaction follows, and, as in the case quoted from Dr. Sutphen, good results will sometimes follow. Great care should be taken to perform a perfectly antiseptic operation, and, as Dr. Sutphen suggests, the rotation of the eyeball back to its normal position when released by the fixation forceps, virtually converts the scleral wound into a subconjunctival one, and this appears to be advantageous in preventing infection.

Hugh M., the case to which I have already called your attention, has implored me to repeat the operation which more than a year ago, when performed by Dr. Sutphen, was productive of good results. It does not seem to me to hold forth much hope now, but, as experience shows it can do no harm, I will perform for you the operation of scleral puncture. I seize the eyeball with fixation forceps, rotate

it inward, and thrust a Graefe cataract-knife through the sclera between insertion of the external and inferior rectus at about the equator. I now turn the knife slightly upon its axis, the wound gapes, and you see the escape of serous fluid, which forms a good-sized bleb beneath the conjunctiva. A double figure-of-eight bandage is applied, and the patient put to bed.

A very interesting *résumé* of the methods of treatment of detachment of the retina has been published by Emil Grosz.* After gathering together his statistics from the reported cases of the various procedures, he finds that in sixty-five per cent. of the cases puncture of the retina, in forty-four per cent. puncture of the sclera, in sixty-six per cent. iridectomy, and in fifty-nine per cent. pilocarpine injections remained fruitless. He holds, however, that these results are not trustworthy, because most of the authors were satisfied with an indefinite expression of improvement without careful investigation of the visual acuity and the duration of the improvement. In contrast to these statistics, he gathers together those from the Ophthalmic Clinic of Professor Schulek, in Buda-Pesth. In the last fifteen years 6971 cases were treated, and 67 of these were affected with retinal detachment. The various methods and the results are thus summarized:

1. Puncture of the sclera in 21 cases, with negative result 14 times, improvement 4 times, and deterioration three times.
2. Iridectomy in 18 cases, with negative result 7 times, improvement 6 times, and deterioration 5 times.
3. Puncture of the retina in 2 cases, with negative results in 2.
4. Pilocarpine injection in 16 cases, with negative results in 10, and improvement in 6.
5. Combined puncture of the sclera and pilocarpine injection in 9 cases, with negative results in 6, and improvement in 3.
6. Iodine injections, after the method of Schoeler, in 2 cases, with negative results in 2.

Improvement, therefore, was obtained with pilocarpine injections in thirty-three per cent., iridectomy in thirty-three per cent., puncture of the sclera in twenty per cent., combined pilocarpine injection and puncture of the sclera in thirty-three per cent. He naturally concludes from these statistics that pilocarpine injections should be considered first of all, then iridectomy, and afterwards puncture of the sclera. Iridectomy should be first performed because, after an

* Abstract in Nagel's "Jahresbericht für Ophthalmologie," vol. xxi. p. 95.

improvement in the circulation of the globe, there is more probability of absorption or drainage of the subretinal fluid. No doubt all of us agree that pilocarpine injection should receive the first place in our methods of treating this disease, but most of us do not accord the second place to iridectomy, but, as I have already stated, prefer puncture of the sclera in the manner just performed.

*PHENATE OR CARBOLATE OF COCAINE
AS A LOCAL ANÆSTHETIC.*

By D. B. KYLE, M.D.

Assistant Demonstrator of Pathology in the Jefferson Medical College.

THE need of a good local anæsthetic from which there is no danger of oversystemic action has long been felt by the medical profession.

Probably no better drug than the muriate of cocaine has been produced, but it is open to the one serious objection that when applied to cut surfaces it produces dangerous systemic action, endangering the life of the patient, and in a limited number of cases causing death.

Believing the combination of carbolic acid and cocaine to be an excellent one theoretically, from the fact of both possessing anæsthetic properties, and the former one of the best known antiseptics, the writer decided to test the practical use of the drug.

The phenate of cocaine is one of the many preparations by Merck. It is described as a slightly-colored substance, of the consistence of thick honey, which readily melts when heated, and containing seventy-five per cent. of the cocaine alkaloid.

It is soluble in alcohol of from thirty to fifty per cent., the solution having a faint odor of carbolic acid.

The dose of the drug is from $\frac{1}{12}$ to $\frac{1}{8}$ grain, repeated every four hours. Locally, it is applied in solutions varying from one to ten per cent.

How much the antiseptic properties of the carbolic acid are affected by the chemical combination we leave open for discussion, suffice to say that the solution was applied to cut surfaces in which no other antiseptic was used, and in all cases the results were equally as good as in those where such solutions as peroxide of hydrogen or carbolized benzoninol were used.

As to the antiseptic properties, some few tests have been completed and others are being carried on.

These tests confirm the statement that the

combination still possesses antiseptic properties, but not equal to the carbolic acid alone.

It is the writer's belief that it at least retards the growth of micro-organisms.

As a local anæsthetic, the power of cocaine is very great over limited areas. This is especially true when applied to mucous membranes. Applied to such structures as the Schneiderian membrane, the mucous covering of the glans penis, or by hypodermic injection, it causes limited blood-supply by contraction, and produces temporary anæsthesia.

If applied to the tongue, it temporarily perverts both taste and tactile sensibility. Applied to the ocular conjunctiva, it not only produces profound anæsthesia of this membrane, but causes dilatation of the pupil, partial paralysis of accommodation, enlargement of the palpebral fissure, slight lachrymation, and often temporary ptosis.

The physiological action of the phenate of cocaine is practically the same, at least as far as the writer has been able to test.

It might be best to state that the writer's experience with the drug has been limited exclusively to throat and nose work.

In testing its anæsthetic properties, ten different solutions were used, ranging in strength from one to ten per cent., the six- and eight-per-cent. solutions answering as well for all operations as the nine and ten. The applications were limited to the nasal and pharyngeal mucous membrane.

For thermo-cautery application in follicular or granular pharyngitis, where the burning is superficial, the two- to four-per-cent. solution gave equally as good results as the higher ones. The one- and two-per-cent. solutions were not satisfactory; for prolonged operations and those involving deeper tissue the stronger solutions must be used.

As a local anæsthetic, I have used the drug in twenty-four separate cases, as follows: Four cases when removing the hypertrophied inferior turbinated bone by means of saw and cautery snare; two cases of exostosis of septum removed by saw and knife; five cases of enlarged tonsils reduced by thermo-cautery; three cases of follicular pharyngitis treated by puncture with cautery needle; two of adenoid vegetations at the vault of the pharynx treated by flat, curved cautery-blade; three cases of hypertrophic rhinitis; one case of hay fever, on which I operated for hypertrophied turbinated bone; and four cases of nasal polypi.

In each of these cases I kept a record of the number of times applied and length of time before anæsthesia was produced.